HM

# INSTRUCTION MANUAL
# HARMONIC MARKERS
# MODEL HM

Texscan

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# MODEL HM HARMONIC MARKERS

## 1.0 INTRODUCTION

Model HM Harmonic Markers are crystal-controlled, solid-state, plug-in modules designed for use in the birdy-bypass marker system of most Texscan sweep signal generators. Each HM marker module, when inserted into a marker amplifier and activated by a front-panel switch on the sweep signal generator, provides frequency identification at integral multiples of the fundamental in a detected RF sweep display. An HM-10 marker, for example, identifies the frequency at 10-MHz intervals up to 1200 MHz. Most Texscan sweep signal generators provide for a combination of HM (harmonic) and SM (single frequency) plug-in markers.

In the HM markers, a sample of the swept RF output of the sweep signal generator is mixed with a chain of harmonically related frequencies supplied by a CW oscillator and frequency multiplier chain. The marker amplifier passes a narrow band of frequencies near the zero beats which result when the swept RF is equal to one of the harmonic frequencies. These resultant bands of frequencies, accurately spaced, are amplified and become the birdy marker which is added to the detected output of the device under test to identify frequency intervals.

## 1.1 HM MARKER SPECIFICATIONS

**1.1.1 Frequency Intervals Available:** 0.1 MHz, 0.25 MHz, 0.5 MHz, 1 MHz, 5 MHz, 10 MHz, 50 MHz, and 54 MHz

NOTE: Other HM Markers are available for different frequency intervals, and for different frequency ranges.

**1.1.2 Frequency Range:**

| | |
|---|---|
| HM-0.1 | 0.1 MHz to 600 MHz |
| HM-0.25 | 0.25 MHz to 1200 MHz |
| HM-0.5 | 0.5 MHz to 1200 MHz |
| HM-1 | 1 MHz to 1200 MHz |
| HM-5 | 5 MHz to 1200 MHz |
| HM-10 | 10 MHz to 1200 MHz |
| HM-50 | 50 MHz to 1200 MHz |
| HM-54 | 54 MHz to 1200 MHz |

**1.1.3 Accuracy (Crystal):** ±0.005%

**1.1.4 Marker Amplitude:** Greater than 0.3 volt peak-to-peak. On the CS and LS units, the amplitude is greater than 0.15 volt peak-to-peak.

**1.1.5 Typical Marker Width:** HM 0.1, 25 kHz to 50 kHz; HM-1, 5, 10, 50, 54, 50 kHz to 200 kHz.

1.1.6 Net Weight: Approximately 8 ounces (0.23 kg).

1.1.7 Size: See Figure 1.

The following paragraphs identify connectors.

1.1.8 BNC Connectors:

| | |
|---|---|
| Input Sweep Sample: | J1 |
| Output Sweep Sample: | P2 |

1.1.9 Six-Pin Plug Terminals:

| | |
|---|---|
| Pin #1: | Not used |
| Pin #2: | (Alternate +100 volts B+. Not use in Texscan sweep generators). |
| Pin #3: | Not used. |
| Pin #4: | Marker output to marker preamplifi in sweep generator. |
| Pin #5: | Not used |
| Pin #6: | +30 volts B+. Supplied by Texscan sweep generator |

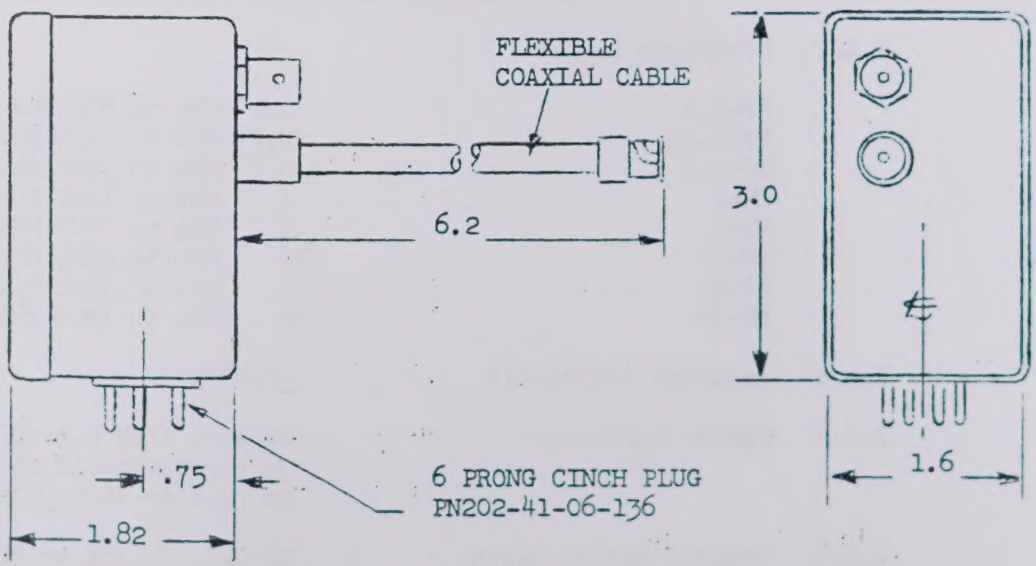



FIGURE 1: OUTLINE DRAWING OF HM MARKER

## 2. DESCRIPTION

A block diagram of the HM marker is shown in Figure 2. Each HM marker consists of a crystal-controlled oscillator, a mixer, and a low-frequency amplifier which amplifies the low-level birdies.

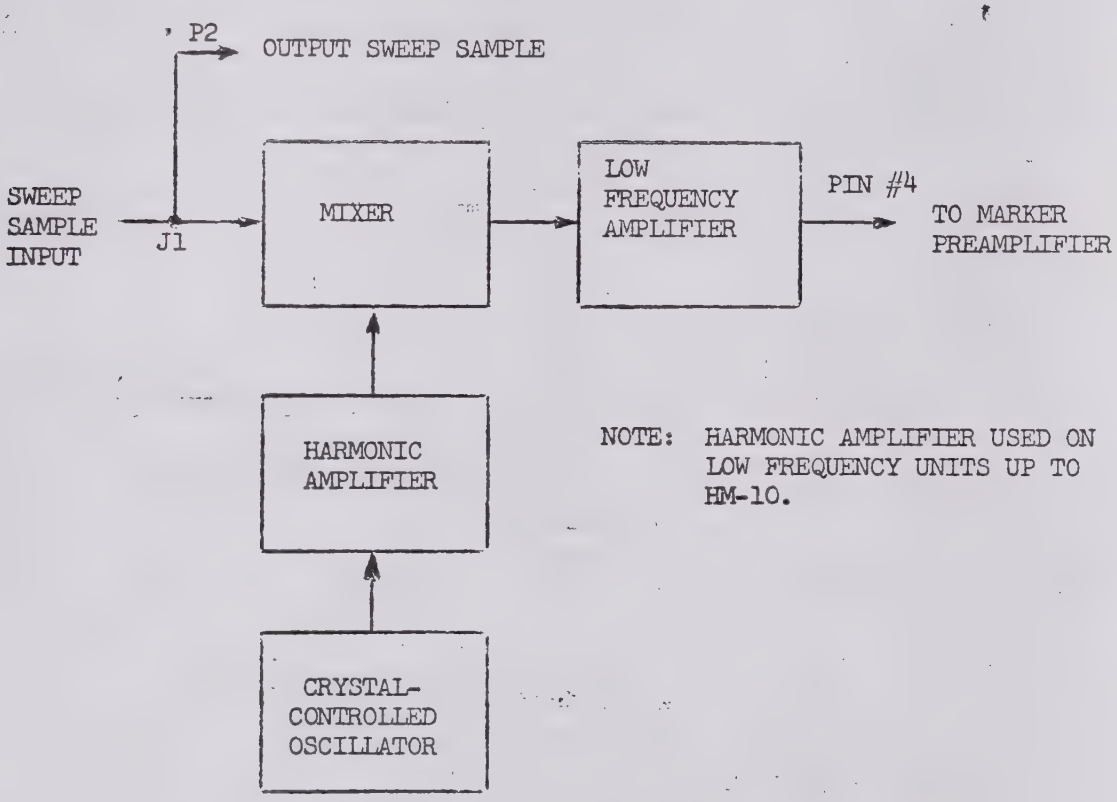



FIGURE 2: HM MARKER BLOCK DIAGRAM

Low frequency HM markers also use a harmonic amplifier stage to increase the harmonic content of the signal prior to mixing.

There are no internal or external controls in standard HM markers.

## 3. INSTALLATION

3.1 Plug each HM marker module into a 6-pin socket provided in the marker amplifier of the sweep generator. Some Texscan sweep generators permit up to eight plug-in markers. Combinations of HM (harmonic) or SM (single frequency) markers are installed in the order preferred.

3.2 Connect the sweep sample cable from the sweep generator to connector J1 on the HM marker module.

3.3 Connect the output cable connector P2 to either J1 of the adjacent plug-in marker, or to the 50-ohm termination (TF-50) in the sweep generator. See the plug-in marker setup Figure 3.

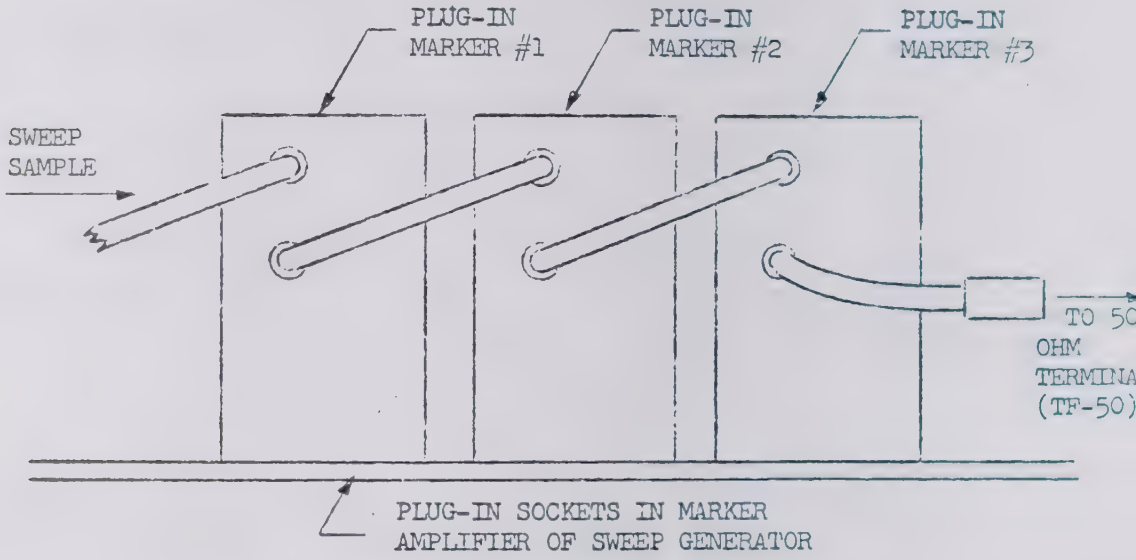



FIGURE 3: PLUG-IN MARKER SETUP

4. OPERATION

4.1 Setup for Marker Display

1. To display HM markers use the equipment setup in Figure 4.

2. Set the sweep generator front-panel controls as follows:

| Control | Setting |
|---|---|
| POWER switch | ON |
| MARKER switch | ON (for the desired marker) |
| CENTER FREQUENCY | Mid-frequency of sweep generator |
| SWEEP WIDTH | 5 to 10 times the HM marker fundamental frequency. Example: For HM-10 set the sweep width to 100 MH |

| Control | Setting |
|---|---|
| RATE | LINE |
| MARKER SIZE | As required |
| MARKER SHAPE | As required |

3. Internal marker size controls in the marker preamplifier of the sweep generator can be preset to a desired level. For example, HM-1 markers would have smallest size followed by the HM-10, and HM-50.

4. Set the oscilloscope for a readable display.

5. The HM markers should be displayed at approximately equal horizontal intervals across the display. For example, 10 intervals for an HM-10 marker.

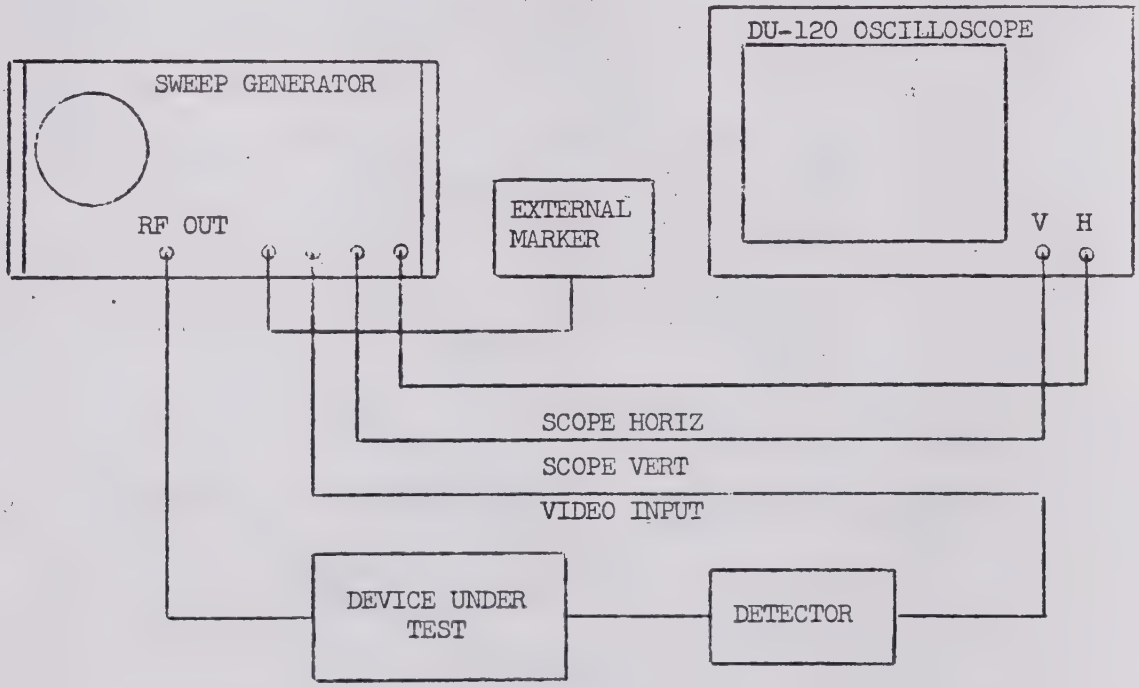



FIGURE 4: SETUP FOR BIRDY-BYPASS MARKER SYSTEM OF SWEEP GENERATOR

## 4.2 Applications

1. The principal application of SM (single) and HM (harmonic) markers is for frequency identification in a detected RF sweep display using the setup in Figure 4. The alignment of amplifiers, tuners, filters and other similar electronic devices is facilitated by the use of birdy markers in the sweep generator.

2. The zero beat of a birdy marker can also be identified using an audio amplifier and headphone or speaker setup. The sweep generator is set for CW or MANUAL mode and tuned through the marker frequency until a zero beat is heard as both the beat frequency and amplitude approach zero. Acquire birdy at SCOPE VERT connector of Figure 4.

3. The birdy-bypass marker system of a Texscan sweep generator can also be used to identify frequencies from a second sweep generator which has no marker system. A sweep sample from the second sweep generator is fed to the sweep input of the SM or HM marker. The setup is similar to Figure 4 except the RF OUT and SCOPE HORIZ signals are obtained from the second sweep generator.

4. By feeding a CW signal directly into the EXT MARKER INPUT of a Texscan sweep generator, the frequency of an adjustable CW signal source can be identified by aligning the external birdy with an SM or HM birdy in the detected RF sweep display. Use the setup in Figure 4.

5. The frequency accuracy of an HM marker ($\pm$0.005%) depends upon its crystal oscillator. The accuracy should be retained over a period of years. It can be checked against an adjustable CW signal whose frequency is read by an electronic counter with a known accuracy. Use the procedure in step 4 above. Align the zero beat of the CW signal with the zero beat of the marker fundamental. The difference between the HM marker fundamental frequency and the counter frequency with the zero beats aligned is the error.

## 5. ALIGNMENT

There are no alignment controls in HM markers. Inoperative units should be returned to the factory for repair.

## REPLACEABLE PARTS LIST

### HM-0.1 MARKER

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | **CAPACITOR** |
| C1 | 012-001 | 1000 pF, feedthru |
| C2 | 012-001 | 1000 pF, feedthru |
| C3 | 012-134 | 0.05 uF, 50 V |
| C4 | 012-050 | 0.01 uF, 100 V |
| C5 | 012-114 | 0.02 uF, 100 V |
| C6 | 012-050 | 0.01 uF, 100 V |
| C7 | 012-050 | 0.01 uF, 100 V |
| C8 | 012-009 | 1000 pF |
| C9 | 012-009 | 1000 pF |
| C10 | 012-013 | 120 pF |
| C11 | 012-084 | 33 pF |
| C12 | 012-034 | 5000 pF |
| C13 | 012-009 | 1000 pF |
| C14 | 012-033 | 470 pF |
| C15 | 012-034 | 5000 pF |
| C16 | 015-010 | Variable, 9-35 pF |
| | | **DIODE** |
| CR1 | 025-002 | 1N82A |
| CR2 | 025-002 | 1N82A |
| | | **CONNECTOR** |
| J1 | 020-011 | UG-625B/U |
| J2 | 020-018 | MX-1684/U |
| | | **INDUCTOR** |
| L1 | 035-007 | 10 mH |
| L2 | 035-002 | 2.2 uH |
| L3 | 035-007 | 10 mH |
| | | **CONNECTOR** |
| P1 | 044-002 | Plug, 6 pin |
| P2 | 020-021 | UG-88C/U |
| | | **TRANSISTOR** |
| Q1 | 062-001 | 2N3564 |
| Q2 | 062-001 | 2N3564 |
| Q3 | 062-001 | 2N3564 |
| Q4 | 062-003 | 2N3567 |

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | RESISTORS |
| R2 | 045-752 | 10 K Ω, ¼W, 10% |
| R3 | 045-822 | 470 K Ω, ½W, 10% |
| R4* | | 10 K Ω, ¼W |
| R6 | 045-822 | 470 K Ω, ¼W, 10% |
| R7 | 045-686 | 270 Ω, ¼W, 10% |
| R8 | 045-780 | 47 K Ω, ¼W, 10% |
| R9 | 045-822 | 470 K Ω, ¼W, 10% |
| R10 | 046-131 | 3.3 K Ω, ½W, 10% |
| R11 | 045-794 | 100 K Ω, ¼W, 10% |
| | | CRYSTAL |
| Y1 | 023-001 | 100 kHz |

* Factory Selected Value

## HM-0.5 MARKER

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | CAPACITORS |
| C1 | 012-001 | 1000 pF |
| C2 | 012-034 | 5000 pF |
| C3 | 012-001 | 1000 pF |
| C4 | 012-050 | 0.01 uF |
| C5 | 012-034 | 5000 pF |
| C6 | 012-050 | 0.01 uF |
| C7 | 012-009 | 1000 pF |
| C9 | 012-009 | 1000 pF |
| C10 | 012-010 | 3 pF |
| C11 | 012-007 | 20 pF |
| C12 | 012-009 | 1000 pF |
| C13 | 012-143 | 220 pF |
| C14* | 012-012 | 50 pF |
| C15 | 012-144 | 2200 pF |
| C16 | 012-009 | 1000 pF |
| | | DIODES |
| CR1 | 025-002 | 1N82A |
| | | CONNECTORS |
| J1 | 020-011 | UG-625B/U |
| J2 | 020-018 | MX-1684/U |
| | | INDUCTORS |
| L1 | 035-007 | 10 mH |
| L2 | 035-004 | 0.68 uH |
| L3 | | Factory Selected |
| L4 | 035-007 | 10 mH |
| | | CONNECTORS |
| P1 | 044-002 | Plug, 6 pin |
| P2 | 030-021 | UG-88C/U |
| | | TRANSISTORS |
| Q1 | 062-002 | 2N3565 |
| Q2 | 062-001 | 2N3564 |
| Q3 | 062-001 | 2N3564 |
| Q4 | 062-001 | 2N3564 |

* Factory Selected Value

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | RESISTORS |
| R2 | 046-142 | 5.6 K Ω, ½ W, 10% |
| R3 | 045-766 | 22 k Ω, ¼ W, 10% |
| R4 | 045-822 | 470 K Ω, ¼ W, 10% |
| R5 | 045-766 | 22 k Ω, ¼ W, 10% |
| R6 | 045-822 | 470 K Ω, ¼ W, 10% |
| R7 | 045-672 | 120 Ω, ¼ W, 10% |
| R8 | 045-630 | 12 Ω, ¼ W, 10% |
| R9 | 045-766 | 22 K Ω, ¼ W, 10% |
| R10 | 045-822 | 470 K Ω, ¼ W, 10% |
| R11 | 045-808 | 220 K Ω, ¼ W, 10% |
| R13 | 045-762 | 18 K Ω, ¼ W, 10% |
| R14 | 045-672 | 120 Ω, ¼ W, 10% |
| R15 | 045-762 | 18 K Ω, ¼ W, 10% |
| | | CRYSTAL |
| Y1 | 023-005 | 0.5 MHz |

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | CAPACITORS |
| C1 | 012-001 | 1000 pF, Feedthru |
| C2 | 012-034 | 5000 pF |
| C3 | 012-001 | 1000 pF, Feedthru |
| C4 | 012-050 | 0.01 uF |
| C5 | 012-034 | 5000 pF |
| C6 | 012-050 | 0.01 uF |
| C7 | 012-009 | 1000 pF |
| C9 | 012-009 | 1000 pF |
| C10 | 012-010 | 3 pF |
| C11 | 012-007 | 20 pF |
| C12 | 012-009 | 1000 pF |
| C13 | 012-143 | 220 pF |
| C14* | 012-012 | 50 pF (nominal) |
| C15 | 012-144 | 2200 pF |
| C16 | 012-009 | 1000 pF |
| | | DIODE |
| CR1 | 025-002 | 1N82A |
| | | CONNECTOR |
| J1 | 020-011 | UG-625B/U |
| J2 | 020-018 | MX-1684/U |
| | | INDUCTORS |
| L1 | 035-007 | 10 mH |
| L2 | 035-004 | 0.68 uH |
| L3 | | Factory Selected |
| L4 | 035-007 | 10 mH |
| | | CONNECTOR |
| P1 | 044-002 | Plug, 6 Pin |
| P2 | 020-021 | UG-88C/U |
| | | TRANSISTORS |
| Q1 | 062-002 | 2N3565 |
| Q2 | 062-001 | 2N3564 |
| Q3 | 062-001 | 2N3564 |
| Q4 | 062-001 | 2N3564 |

* Factory Selected Value

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | RESISTORS |
| R2 | 046-142 | 5.6 K Ω, ½ W, 10% |
| R3 | 045-766 | 22 K Ω, ¼ W, 10% |
| R4 | 045-822 | 470 K Ω, ¼ W, 10% |
| R5 | 045-766 | 22 K Ω, ¼ W, 10% |
| R6 | 045-822 | 470 K Ω, ¼ W, 10% |
| R7 | 045-672 | 120 Ω, ¼ W, 10% |
| R8 | 045-630 | 12 Ω, ¼ W, 10% |
| R9 | 045-766 | 22 K Ω, ¼ W, 10% |
| R10 | 045-822 | 470 K Ω, ¼ W, 10% |
| R11 | 045-808 | 220 K Ω, ¼ W, 10% |
| R13 | 045-762 | 18 K Ω, ¼ W, 10% |
| R14 | 045-672 | 120 Ω, ¼ W, 10% |
| R15 | 045-762 | 18 K Ω, ¼ W, 10% |
| | | CRYSTAL |
| Y1 | 023-005 | 1" MHz |

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | CAPACITORS |
| C1 | 012-001 | 1000 pF, Feedthru |
| C2 | 012-005 | 0.01 uF |
| C3 | 012-001 | 1000 pF, Feedthru |
| C4 | 012-005 | 0.01 uF |
| C5 | 012-013 | 120 pF |
| C6 | 012-010 | 3 pF |
| C7 | 012-011 | 10 pF |
| C8 | 012-012 | 50 pF |
| C9 | 012-011 | 10 pF |
| C10 | 012-013 | 120 pF |
| | | DIODES |
| CR2 | 025-002 | 1N82A |
| CR3 | 025-002 | 1N82A |
| | | CONNECTORS |
| J1 | 020-011 | UG-625B/U |
| J2 | 020-018 | MX 1684/U |
| | | INDUCTOR |
| L1 | 035-001 | 1 uH |
| | | CONNECTORS |
| P1 | 044-002 | Plug, 6 pin |
| P2 | 020-021 | UG-88C/U |
| | | TRANSISTORS |
| Q1 | 062-003 | 2N3567 |
| Q2 | 062-001 | 2N3564 |
| Q3 | 062-001 | 2N3564 |

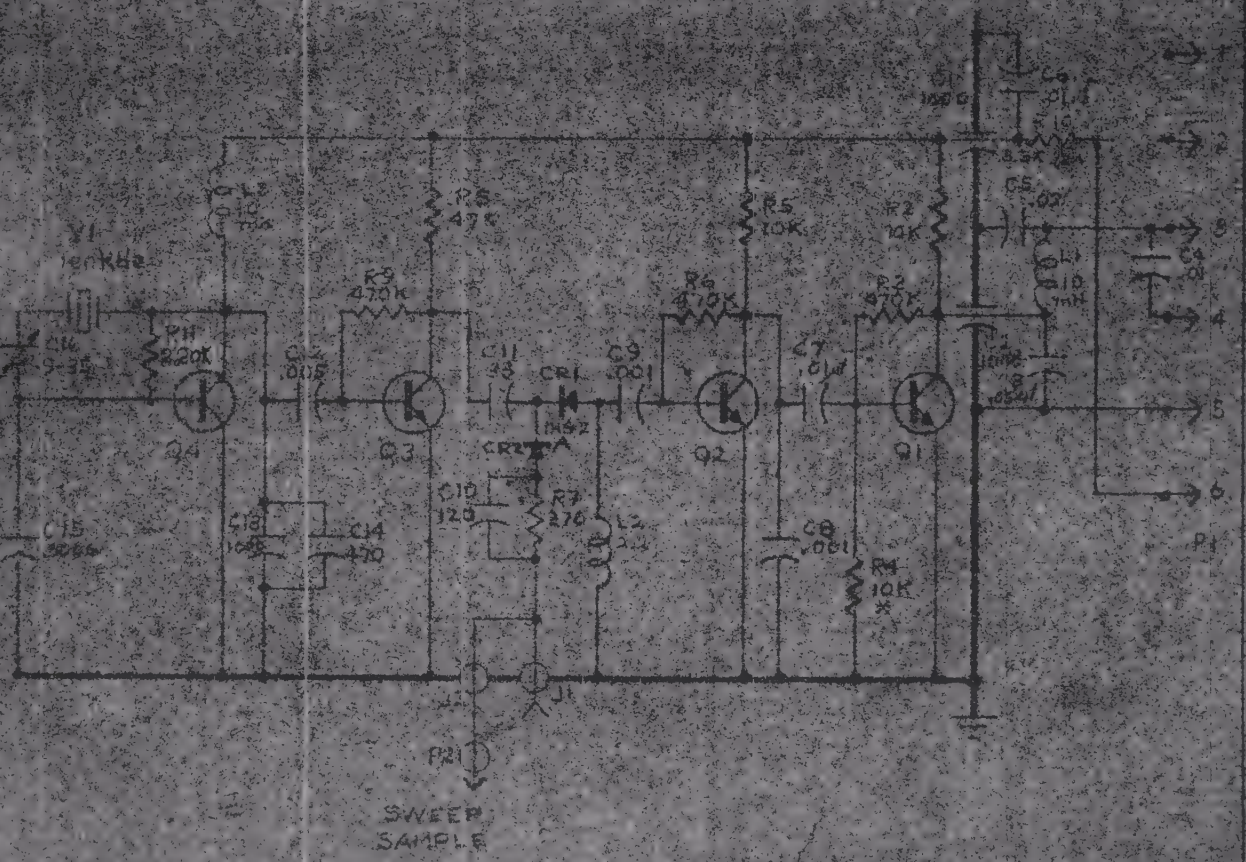
| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | RESISTORS |
| R2 | 046-145 | 6.8 K Ω, ½ W, 10% |
| R3 | 045-752 | 10 K Ω, ¼ W, 10% |
| R4 | 045-794 | 100 K Ω, ¼ W, 10% |
| R5 | 045-672 | 120 Ω, ¼ W, 10% |
| R6 | 045-672 | 120 Ω, ¼ W, 10% |
| R7 | 045-756 | 12 K Ω, ¼ W, 10% |
| R8 | 045-808 | 220 K Ω, ¼ W, 10% |
| R9 | 045-766 | 22 K Ω, ¼ W, 10% |
| R10 | 045-766 | 22 K Ω, ¼ W, 10% |
| R11 | 045-794 | 100 K Ω, 1/4 W, 10% |
| | | CRYSTALS |
| Y1 | 023-005 | 5 MHz (HM-5) |
| Y1 | 023-005 | 10 MHz (HM-10) |

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | CAPACITORS |
| C1 | 012-001 | 1000 pF, Feedthru |
| C2 | 012-005 | 0.01 uF |
| C3 | 012-001 | 1000 pF, Feedthru |
| C4 | 012-007 | 20 pF |
| C5 | 012-009 | 1000 pF |
| C6 | 012-006 | 1.2 pF |
| C7 | 012-009 | 1000 pF |
| C8 | 012-008 | 25 pF |
| | | DIODE |
| CR1 | 025-002 | 1N82A |
| | | CONNECTORS |
| J1 | 020-011 | UG-625B/U |
| J2 | 020-018 | MX-1684/U |
| | | INDUCTORS |
| L1 | 035-001 | 1 uH |
| L2 | 035-002 | 2.2 uH |
| L3 | 035-019 | 4.7 uH |
| | | CONNECTORS |
| P1 | 044-002 | Plug, 6 pin |
| P2 | 020-021 | UG-88C/U |
| | | TRANSISTOR |
| Q1 | 062-003 | 2N3567 |
| Q2 | 062-002 | 2N3564 |

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | RESISTORS |
| R2 | 046-145 | 6.8 K Ω, ½ W, 10% |
| R3 | 045-710 | 1 K Ω, ¼ W, 10% |
| R4 | 045-780 | 47 K Ω, ¼ W, 10% |
| R5 | 045-850 | 2.2 M Ω, ¼ W, 10% |
| R6 | 045-682 | 220 Ω, ¼ W, 10% |
| R7 | 045-752 | 10 K Ω, ¼ W, 10% |
| R8 | 045-808 | 220 K Ω, ¼ W, 10% |
| | | CRYSTAL |
| Y1 | 023-015 | 50 MHz |

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | CAPACITORS |
| C1 | 012-001 | 1000 pF, Feedthru |
| C2 | 012-005 | 0.01 uF |
| C3 | 012-001 | 1000 pF, Feedthru |
| C4 | 012-007 | 20 pF |
| C5 | 012-009 | 1000 pF |
| C6 | 012-006 | 1.2 pF |
| C7 | 012-009 | 1000 pF |
| C8* | 012-008 | 25 pF |
| | | DIODE |
| CR1 | 025-002 | 1N82A |
| | | CONNECTORS |
| J1 | 020-011 | UG-625B/U |
| J2 | 020-018 | MX-1684/U |
| | | INDUCTORS |
| Lk | 035-004 | 0.68 uH |
| L2 | 035-002 | 2.2 uH |
| | | CONNECTORS |
| P1 | 044-022 | Plug, 6 pin |
| P2 | 020-021 | UG-88C/U |
| | | TRANSISTORS |
| Q1 | 062-003 | 2N3567 |
| Q2 | 062-001 | 2N3564 |

| CIRCUIT REF. NO. | TEXSCAN PART NO. | DESCRIPTION |
|---|---|---|
| | | RESISTORS |
| R2 | 046-145 | 6.8 K Ω, ½ W, 10% |
| R3 | 045-710 | 1 K Ω, ¼ W, 10% |
| R4 | 045-780 | 47 K Ω, ¼ W, 10% |
| R5 | 045-850 | 2.2 M Ω, ¼ W, 10% |
| R6 | 045-682 | 220 Ω, ¼ W, 10% |
| R7 | 045-752 | 10 K Ω, ¼ W, 10% |
| R8 | 045-808 | 220 K Ω, ¼ W, 10% |
| | | CRYSTAL |
| Y1 | 023-015 | 59 MHz |




| NOTE SCHEDULE | | |
|---|---|---|
| NOTE | DESCRIPTION | QT |

| G | | |
|---|---|---|
| F | 184 | SEE SHT 3 |
| E | 192 | Y SYMBOL WAS CR SYMBOL DELETED ITEM 19 |
| D | 174 | SEE SHT # 2 |
| C | 194 | SEE SHEET # 2 |
| B | | |
| A | | FINAL RELEASE |

Q1 GE85C8
Q2 2N3904
Q3 2N3904
Q4 GE85C8

ALL RESISTORS TO BE IN OHMS, 1/4 W, 2%
ALL CAPACITORS TO BE IN MICROFARADS
ALL INDUCTORS TO BE IN MICROHENRIES UNLESS OTHERWISE SPECIFIED
* VALUE IS ADJUSTED AT FACTORY

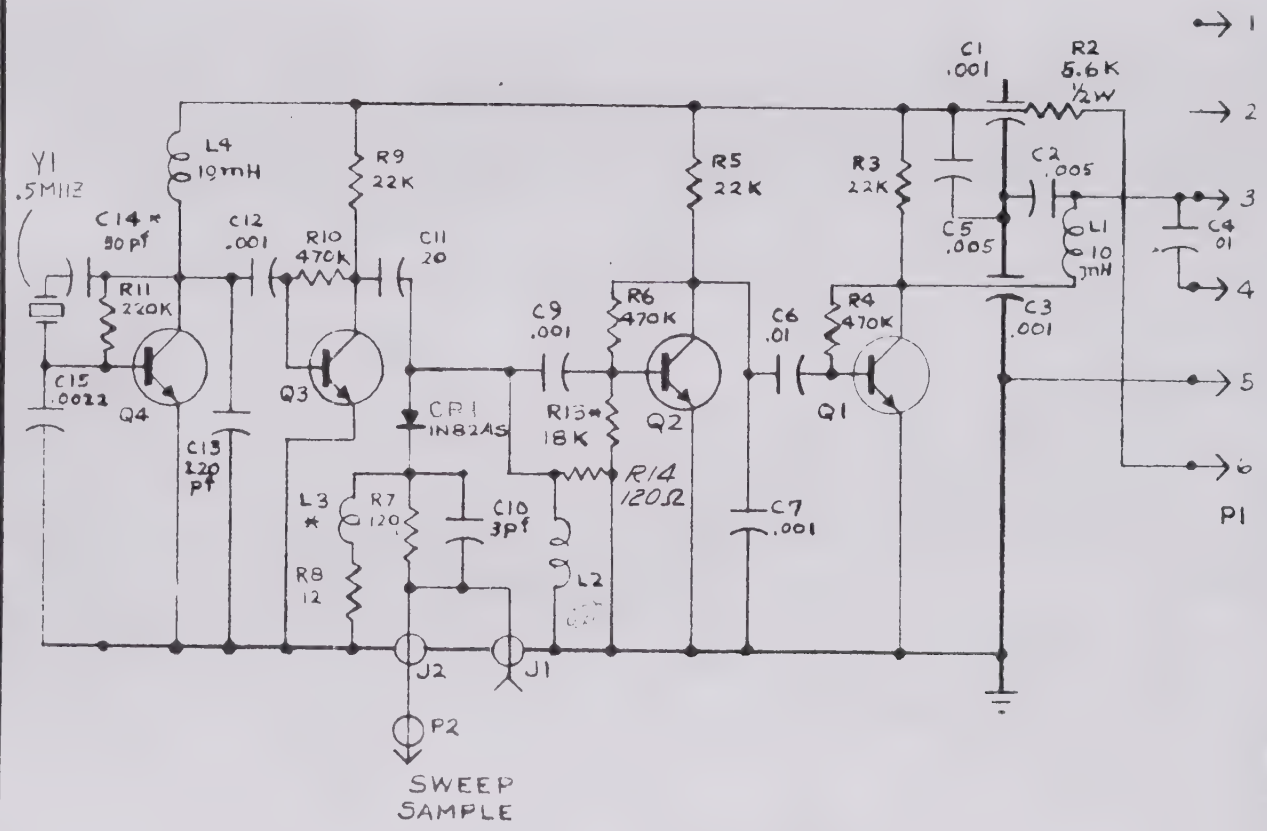
MAT'L
FINISH
SPECIFICATIONS
DECIMAL DIMENSIONS TO BE ± .001
FRACTIONAL DIMENSIONS TO BE ± 1/64
DRILL, PUNCH AND OTHER SPECIAL STOCK SIZES NOT SHOWN

| REV | ECN | DESCRIPTION | BY |
|---|---|---|---|

TEXSCAN CORPORATION
INDIANAPOLIS, INDIANA

SCALE | DRAWN BY | DATE

DIPLEXER SCHEMATIC




* ADJUSTED AT FACTORY

Q1 - 2N3565
Q2 - [illegible]
Q3 - "
Q4 - "

HOLE SCHEDULE

| HOLE | DESCRIPTION | QTY. |
|---|---|---|
| | | |

| REV | ECN. | DESCRIPTION | DATE |
|---|---|---|---|
| F | 1740 | | 2-27-68 |
| E | 1814 | | |
| D | 1720 | SEE SHEET 2 | MM 12-31-13 |
| C | 2039 | SEE SHEET #2 | 10-3-67 |
| B | 2039 | SEE SHEET #2 | 9-5-67 |
| A | | FINAL RELEASE [illegible] | 5/10/67 |

MAT'L:

FINISH:

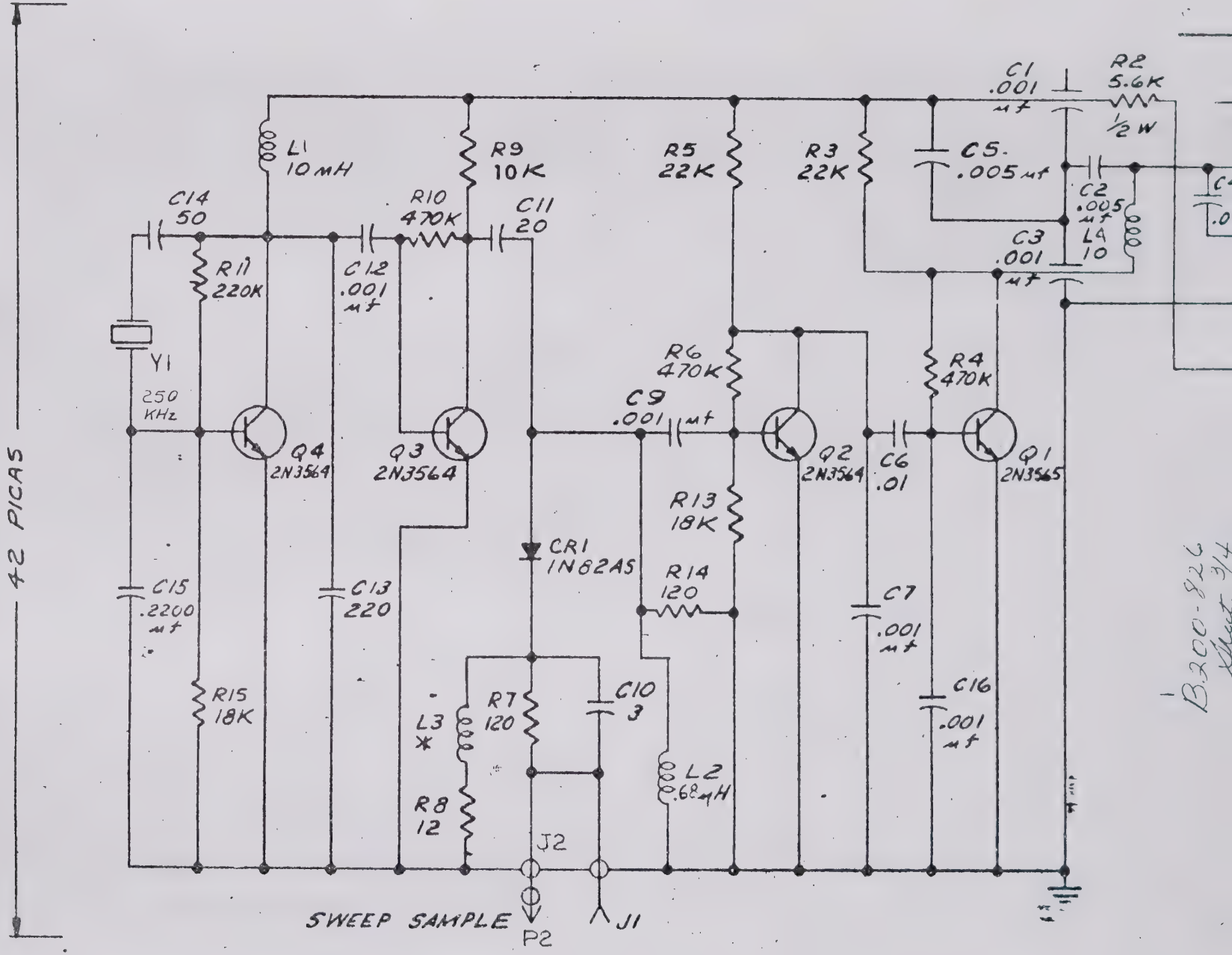
SPECIFICATIONS
DECIMAL DIMENSIONS TO BE ± .005
FRACTIONAL DIMENSIONS TO BE ± 1/64
DRILL, PUNCH, AND COMMERCIAL STOCK SIZES DO NOT APPLY

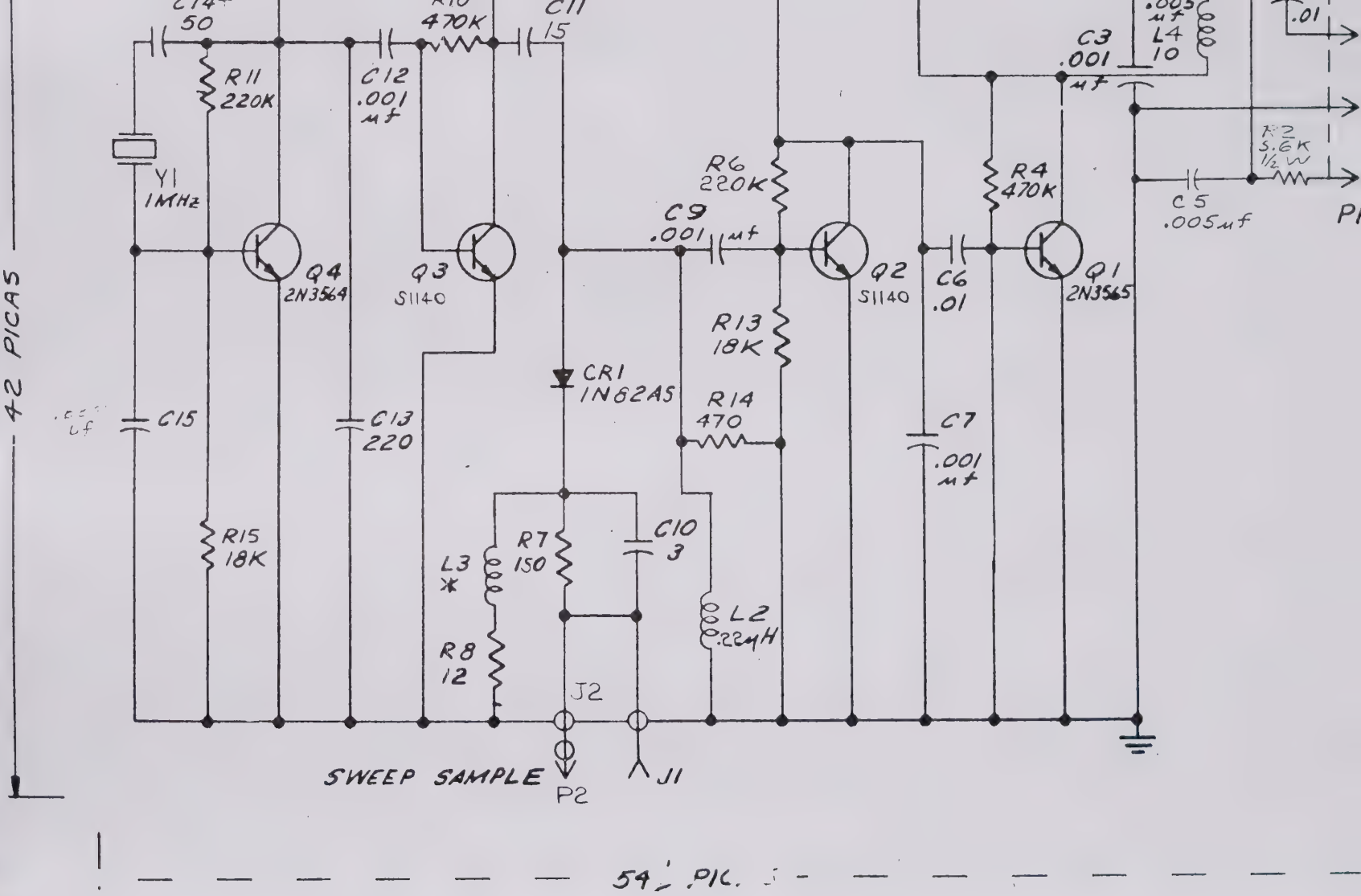
TEXSCAN CORPORATION
INDIANAPOLIS, INDIANA

SCALE | DRAWN BY [illegible] 5/10/67 | APP'D BY [illegible]

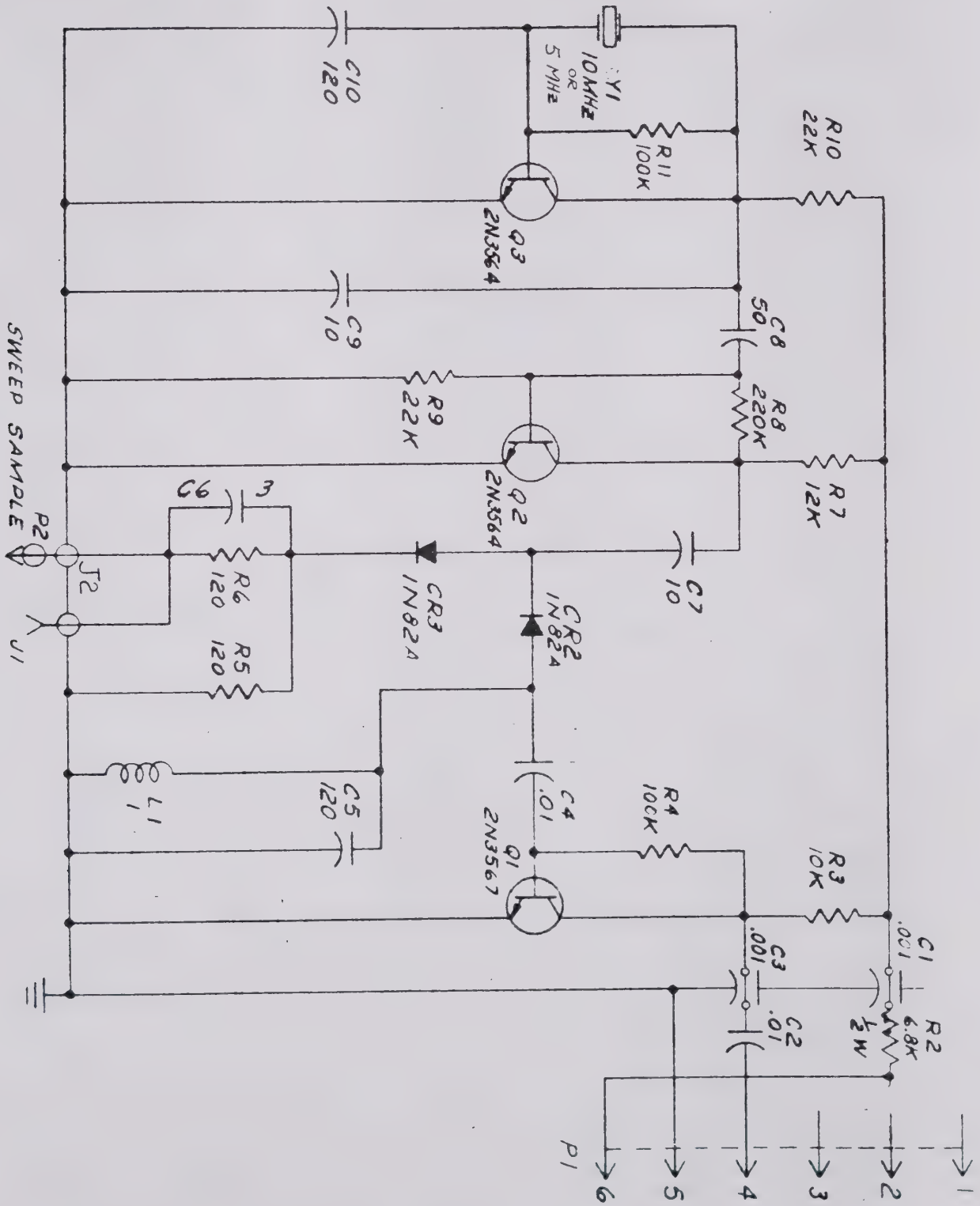
FINAL ASSY. SCHEMATIC
HM-5 MARKER

SHEET 3 | A-200-226

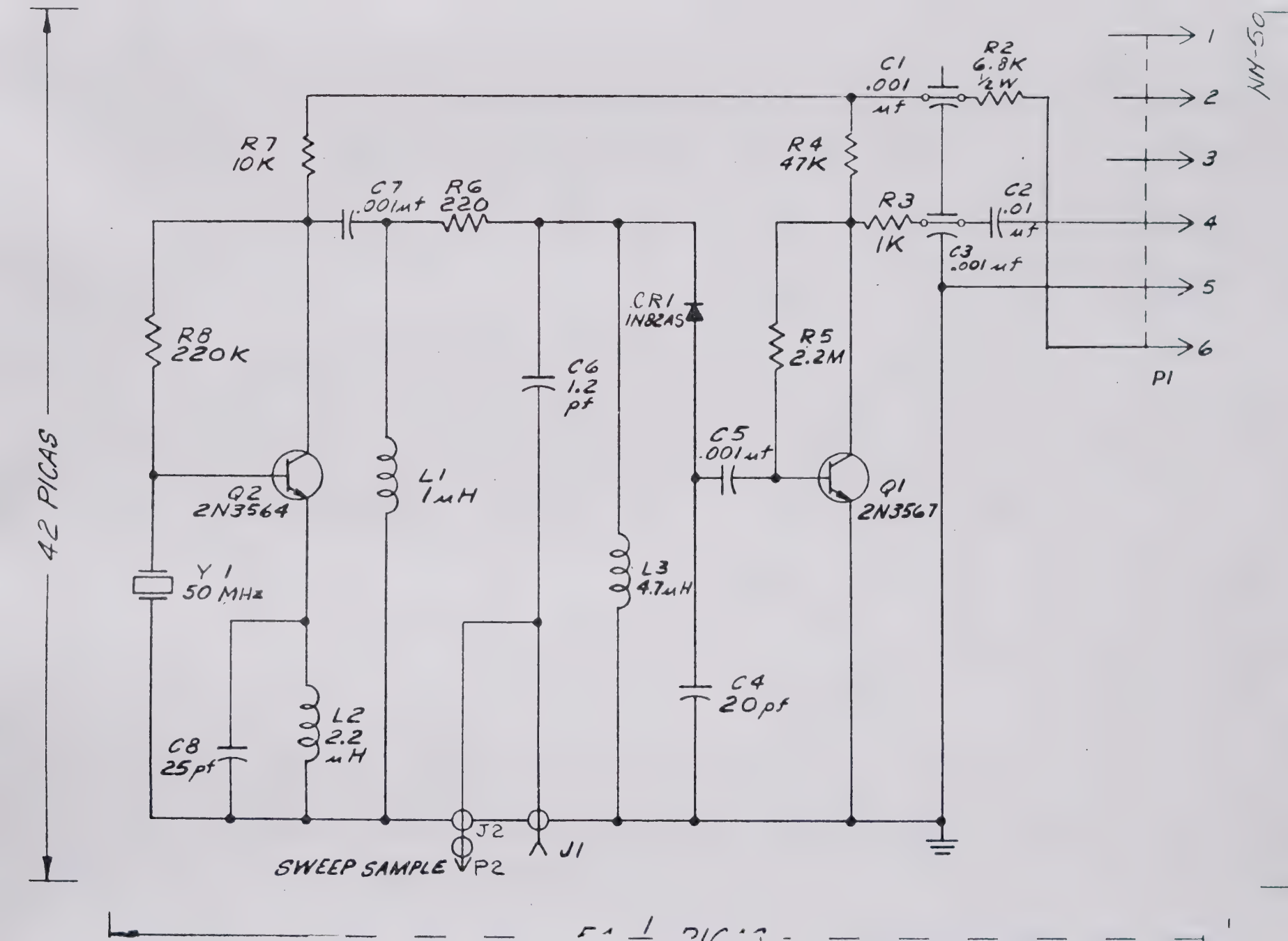

42 PICAS
C1 .001 mf
R2 5.6K ½W
L1 10 mH
R9 10K
R5 22K
R3 22K
C5 .005 mf
C2 .005 mf
L4 10
C3 .001 mf
C14 50
R10 470K
C11 20
R11 220K
C12 .001 mf
Y1
250 KHz
R6 470K
R4 470K
C9 .001 mf
Q4 2N3564
Q3 2N3564
Q2 2N3564
Q1 2N3565
C6 .01
R13 18K
CR1 1N82AS
R14 120
C15 .2200 mf
C13 220
C7 .001 mf
C16 .001 mf
R15 18K
L3 *
R7 120
C10 3
L2 .68 µH
R8 12
J2
SWEEP SAMPLE
P2
J1
B.200-826
Sheet 3/4

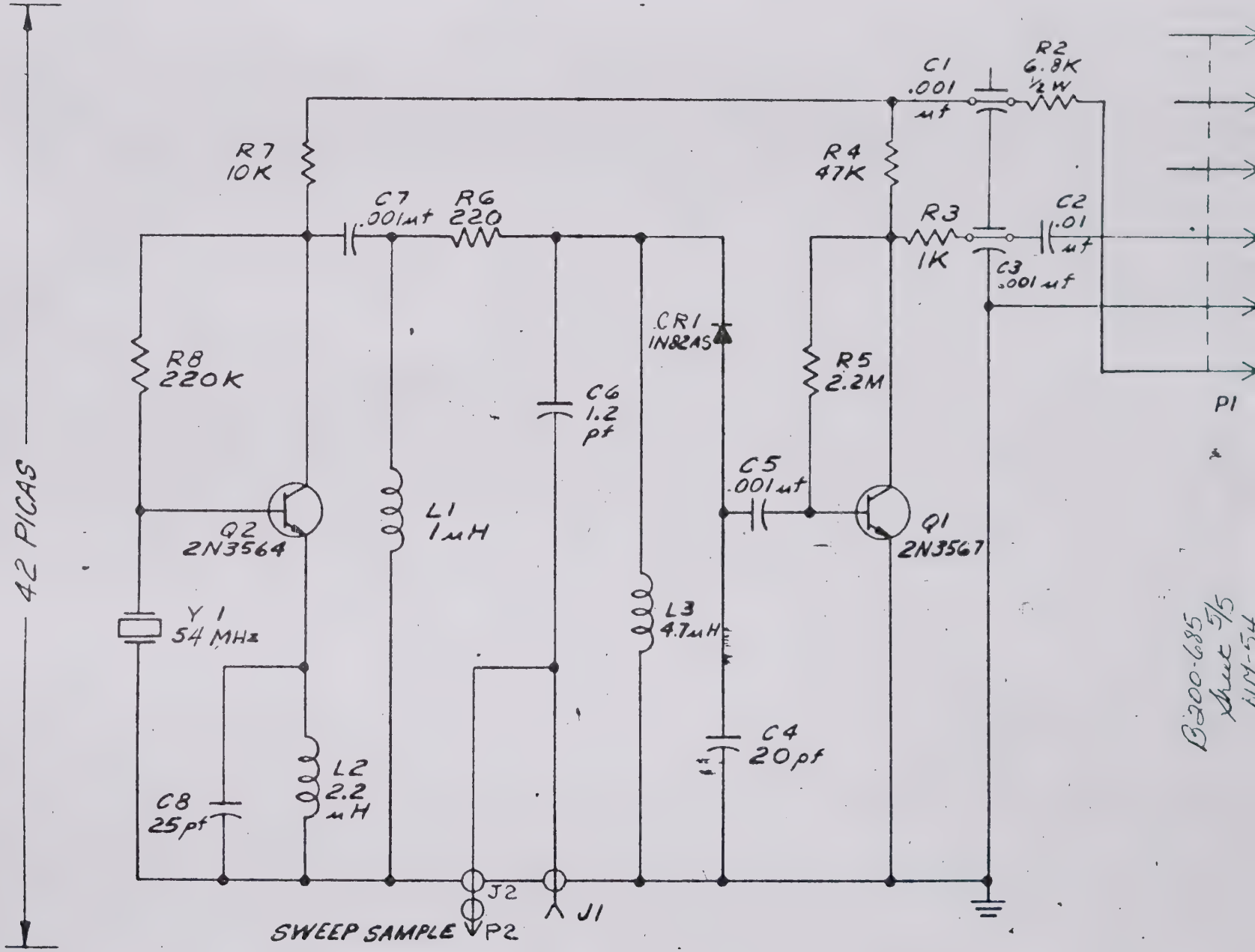

42 PICAS
54 PICAS
C14
50
R11
220K
C12
.001
mf
R10
470K
C11
15
Y1
1MHz
Q4
2N3564
Q3
S1140
C15
C13
220
R15
18K
CR1
IN62A5
R14
470
R13
18K
R6
220K
C9
.001
mf
Q2
S1140
C6
.01
C7
.001
mf
R4
470K
Q1
2N3565
C3
.001
mf
L4
10
.003
mf
.01
R2
5.6K
1/2 W
C5
.005mf
R7
150
C10
3
L3
*
L2
.22μH
R8
12
J2
SWEEP SAMPLE
P2
J1

42 PICAS

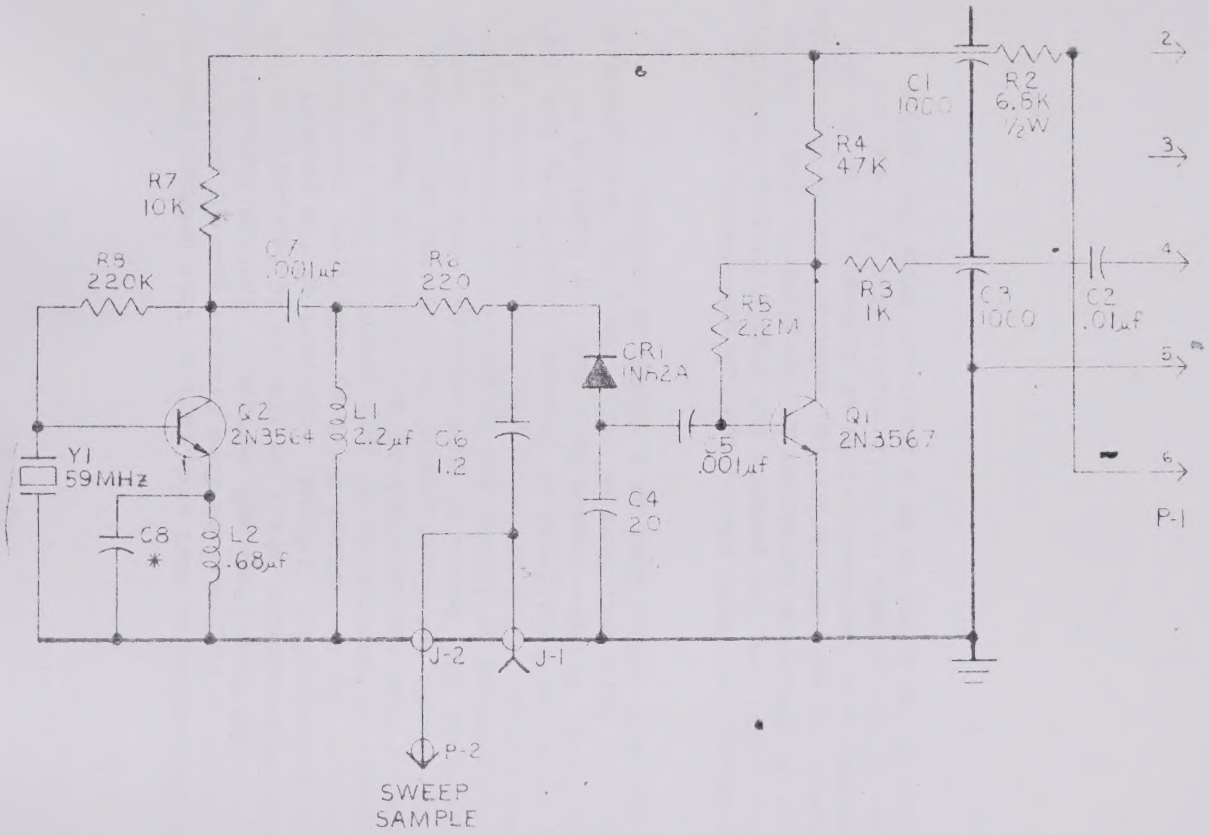



NM-5
NM-10


42 PICAS
NM-50
C1
.001
mf
R2
6.8K
½W
R7
10K
R4
47K
C7
.001mf
R6
220
R3
1K
C2
.01
mf
C3
.001 mf
1
2
3
4
5
6
P1
CR1
IN82AS
R8
220K
C6
1.2
pf
R5
2.2M
C5
.001mf
Q2
2N3564
L1
1mH
Q1
2N3567
Y1
50 MHz
L3
4.7mH
C4
20pf
C8
25pf
L2
2.2
mH
J2
J1
SWEEP SAMPLE
P2




B200-685
Sheet 5/5
11/1-54




HOLE SCHEDULE

| HOLE | DESCRIPTION | QTY. |
|---|---|---|
| | | |

| REV. | ECN. | DESCRIPTION | DATE |
|---|---|---|---|
| H | 3130 | | 5-2-73 |
| G | 2047 | SEE SHEET 1 | 5-25-74 |
| F | 1812 | SEE SHEET 1 | 2-6-74 |
| E | 1720 | SEE SHEET 1 | 10-31-73 |
| D | N/A | SEE SHEET 1 | 6/21/73 |

MAT'L:

FINISH:

SPECIFICATIONS
DECIMAL DIMENSIONS TO BE ± .005
FRACTIONAL DIMENSIONS TO BE ± 1/64
DRILL, PUNCH, AND COMMERCIAL STOCK SIZES DO NOT APPLY

DO NOT SCALE THIS PRINT

TEXSCAN CORPORATION
INDIANAPOLIS, INDIANA

SCALE ~ | DRAWN BY G. COTHRON 6/21/73 | APP'D. BY WAH 6/28/73

MARKER
HM-59 FINAL ASSY.

SHEET 3 OF 4

A200-089

# WARRANTY

Texscan Corporation warrants that each part of this product (except vacuum tubes and batteries) will be free from defects in material and workmanship under normal use and service. Texscan Corporation's obligation under this warranty shall be limited to repairing or replacing, F.O.B. Indianapolis, Indiana, each part of the product (except vacuum tubes and batteries) which is defective, provided that buyer gives Texscan written notice of such defect within a period of one year commencing with the delivery of the product by Texscan Corporation. The remedy set forth herein shall be the only remedy available to the buyer for breach of this warranty, and in no event shall Texscan Corporation be liable for incidental or consequential damages for such breach. This warranty shall not apply to any part of the product which, without fault of Texscan Corporation, has been subject to alteration, failure caused by a part not supplied by Texscan Corporation, accident, fire or other casualty, negligence or misuse, or to any part rather than as a result of defect.

Except for warranties set forth above, and the warranties, if any, available to the buyer from the persons who supply Texscan Corporation any vacuum tubes or batteries contained in the product, there are no warranties, express or implied (including, without implied limitation, any implied warranties of merchantability or fitness), with respect to the condition of the product or their suitability for the use intended for them by the buyer or by a purchaser from the buyer.

REV. 9/2/76